School and Home Garden Section

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LATEST NEWS OF THE AUTOMOBILE TRADE AND INDUSTRY

CONSTRUCTION AND OPERATION OF AUTOMOBILE PARTS DESCRIBED FOR BENEFIT OF MOTORISTS

Frame, Different Types of Springs, Radius Rods and Wheels Discussed in Instructive Booklet

For the benefit of the automobile owner who wishes to learn more of the construction and operation of the various parts of his car, the Vacuum Oil Company is issuing a series of instructive booklets. Herewith are described some of the chassis parts.

Frame

The main frame (Figure 1) consists of pressed steel channel side pieces (A), suitable to the size, appearance and strength required. Steel cross members, or pieces (B), are fastened at the ends of the side members, making with them a rectangular frame. Additional cross members (C) are as supports for the engine and the transmission housing, and also to insure greater rigidity of the frame.

A sub-frame, something added as a support for the engine, has side pieces (D) bolted to the cross members (C). The sub-frame reduces the strain on the motor supports employing four point suspension.

Springs

Springs are built up of a series of flat steel plates or leaves of variable lengths which have been carefully hardened and tempered. The spring leaves are laid one on top of another according to the size, the shortest leaf on the outside of the spring curve. The leaves are held in position by a center bolt and spring clips.

Under slight depression the long spring leaves only are flattened; under heavy depression the shorter leaves assist the longer ones in carrying the load.

The spring shackle consists of two small steel tie plates, bolted to the automobile frame either at spring ends or at spring end and extension bracket.

The spring bolts are of case hardened tool steel. They are fitted with grease ways on their bearing surfaces or are drilled hollow with small right angle passages through which the lubricant is forced to the bearing surfaces by means of a compression grease cup at the end of the bolt.

There are many arrangements of springs, the most common of which are the semi-elliptic, three-quarter elliptic, full elliptic, platform and cantilever. The springs adopted by the various automobile manufacturers are selected to suit the style, size and weight of their cars.

Semi-Elliptic Spring

The semi-elliptic spring (Figure 2) is clamped at its center (A) to the axle. One end of the spring is generally bolted or shackled to an extreme end (B) of the frame, the other spring end (C) being attached or shackled to the side member of the car frome (D). At the end (C) the spring is allowed to move freely in yielding to its elongations, due to the flattening pressure from irregularities in the road.

Three-Quarter Elliptic Spring

The three-quarter elliptic spring (Figure 3) consists of a semi-elliptic spring below shackled at one end to a half-length semi-elliptic spring above.

It is generally used as a rear spring, the thick end of half-length top spring being clamped to the rear end of the automobile frame (D).

The center (A) of the lower part of the spring is clamped to the rear axle housing. The rear lower end (B) is connected to the top part of the spring by means of a shackle. The forward end (C) of the spring is held by means of a bracket, or shackle, to the side member of the automobile frame (D) at some point in front of the rear axle.

Full Elliptic Spring

A full elliptic spring (Figure 4) consists of two semi-elliptic springs bolted together at their ends (B) and clamped at their centers (A) to the automobile frame (D) and axle or axle housing (H), respectively.

Platform Spring

A platform spring (Figure 5) is the arrangement of three semi-elliptic springs for supporting the weight of the rear end of the car and its load. It is composed to two side springs and a transverse rear spring. The two side are shackled at their forward ends(C) springs clamped at their centers (A) to the rear axle or axle housing (H) —only one attachment shown—to the side member of the frame (D) in front of the rear axle. At their rear ends (B) they are shackled to the ends of the transverse spring. The center of the transverse spring is fastened to the rear cross member (E) of the frame.

The platform spring employs two forms of end connection—the cross-yoke type and the ball and socket type. In the cross-yoke type the spring and shackle bolts are equipped with grease cups. In the ball and socket type the ball joints must be oiled regularly.

Cantilever Spring

In point of construction the so-called cantilever spring (Figure 6) is similar to the semi-elliptic, spring, being practically of the same shape and composed of steel leaves laid one on top of another. Its application to the car, however, is different. The forward end (A) is free to move in a bracket or shackle (B), fastened to the side member (D) of the main frame. At or near its center the spring is held by a spring clamp, the lower part (E) of which has a bearing on the center bolt (F), attached to the side member (D) of the main frame. The rear end (G) of the spring is fastened to the rear axle housing (H), allowing a free movement of the spring end (G), the action being like that of a springboard.

The cantilever spring employs a heavy center spring bracket (E), the bolt (F) of which is generally equipped with a grease cup.

It is said that the cantilever spring reduces the vibration of the car body and guarantees smoother riding over rough roads because a larger proportion of the axle vibration is absorbed by the springboard leverage of the cantilever construction.

Radius Rods

The elongation of a body spring under stress would ordinarily throw corrected by the free movement of the the rear axle out of olignment; this is spring shackle and the restricted movement of the radius rods (not shown).

They permit free vertical motion of each wheel end of the rear axle, at the same time maintaining its position of alignment at right angles to the frame of the car.

Radius rods are connected at one end to the outer end of the axle housing, and at the other end directly or indirectly to the automobile frame.

The automobile wheels in general use are of the artillery type (Figure 7), with wood spokes, and are equipped with either ball or roller bearings (not shown), depending upon the type and make of axle used. The bearings are within the wheel hub (B) or in an extended housing (see also Figures 9, 10, 11 and 12).

Pneumatic or solid rubber tires (C) are mounted upon the steel rims (D). The wooden spokes (E) are held in position between outside and inside steel hub flanges (F), bolted together.

Wire Wheels (Figure 8)

Steel clincher rim (D) holds the pneumatic tire (C) firmly in place, and the metal hub (B) holds ball or roller bearings (not shown) on wire wheels (Figure 8). It is said that wire wheels are stronger, lighter, more resilient and more durable than those of the wooden spoke artillery type.

Automobile wheels are universally mounted upon ball or roller bearings, or a combination of both.

Ball and roller bearings are the highest type of anti-friction bearings.

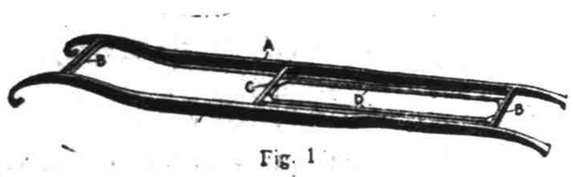


Fig. 1

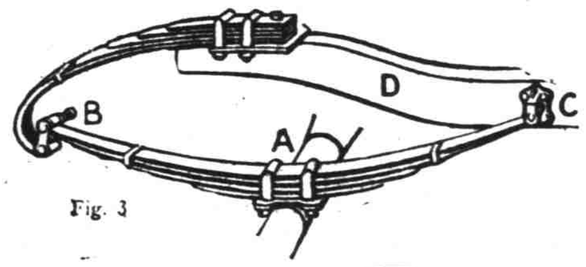


Fig. 3

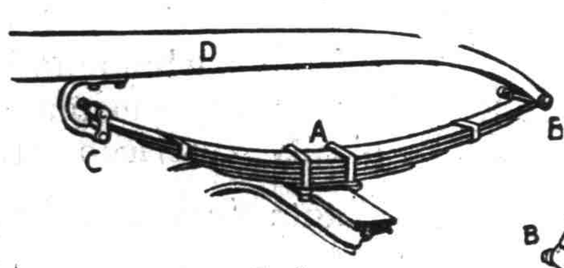
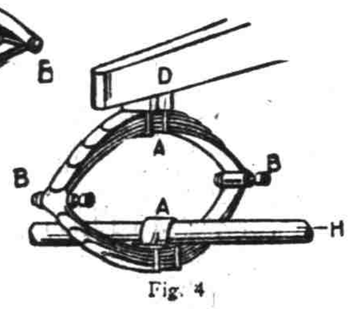


Fig. 2



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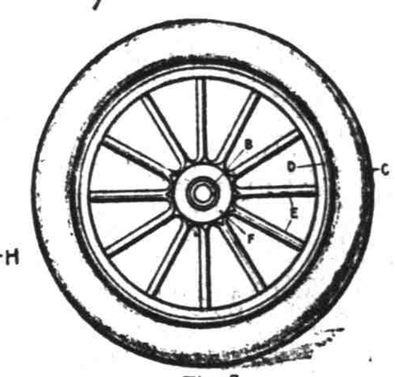

Fig. 7

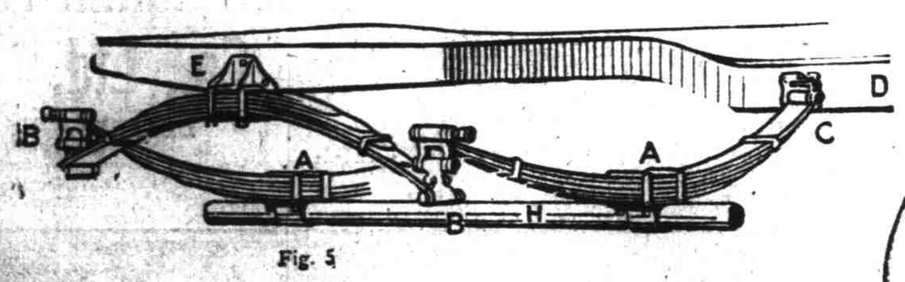

Fig. 5

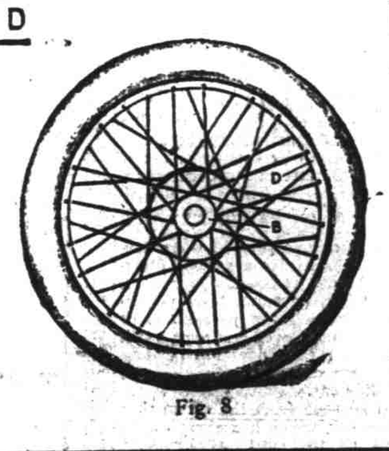

Fig. 8

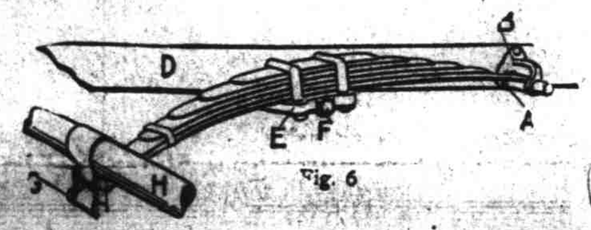

Fig. 6

KEEPING AHEAD MEANS BUSINESS

"Keeping ahead in originating innovations and efficiency features for automobiles and motor trucks demands a thorough knowledge of the possibilities of the automblle," says G. A. Kissel, president of the Kissel Motor Car Co.

"Constantly keeping one ear to the ground and one hand on the pulse of motor car buyers is necessary for the automobile manufacturer who wishes to keep ahead of the procession with innovations that not only make his car stand out from the rest, but will eventually benefit the automobile industry as a whole.

"He must know intimately the past and present history of the automobile in order to successfully originate for the future."

NEVER MISSED MULE; PACKARD TOOK HIS JOB

If the geese of Rome hadn't made it a custom, in those perilous days, of sleeping with one eye open they probably never would have cackled in time to save the Eternal City and the civilization it represented, from the Barbarians. And if justice over is done Mrs. O'Leary's cow, the people of Chicago will cast into everlasting bronze a life-size replica of that well known animal. For had she not kicked over the lantern the greatness that now is Chicago's pride would have been long delayed.

Thus have animals changed the course of history, yet there is none to sing the death of O. H. Nicholas' mule in 1910 except "Ore" himself, as he is known to everyone in Butler, Pa. In that year one of his mules was killed by a fall. Nicholas valued the animal at $200 and its loss seemed a pretty stiff rate of depreciation. After thinking this over he decided to forswear mules and haul with Packard trucks exclusively.

As events have proved, from a financial standpoint, the best thing that Ore's mule ever did for Ore was to die. The first Packard truck was bought for $3750 and sold five years later for $1600. A used Packard bought in 1913 for $2000 was sold two years later for $1500. Both were of the chain drive type and Mr. Nicholas disposed of them to standardize on Packard worm driven trucks, of which he now profitably operates three.

"This incident," said G. R. Bury, assistant general sales manager of the Packard Motor Car Company, "brings home to prospective truck buyers the advantage of buying a truck that at any time in its life has a ready market. There is always a demand for used Packard trucks. Nearly every dealer has a waiting list of buyers. Its the cheap truck that's hard to sell at almost any price."

PRISON ROAD CAMPS SUCCESS IN OKLAHOMA

In Oklahoma the prison road camps are no longer in the experimental stage. They have become an accepted institution in the State. In the central and southwest sections prisoners are building the Ozark trail; in the southeast they are grading the Jefferson highway, and in other districts they are assisting in the local good roads movement.

DISHABILLE

Salesman to lady prospect.—This, madam, is the hand brake. You throw it on in an emergency.

L. P.—Oh, I see—a sort of kimono, so to speak!

99 YEARS OLD AND DRIVES MOTOR CAR

Record of "Grandma" Blakeley, for Whom Mother's Day Was Inaugurated

Mrs. Juliet Calhoun Blakeley, 99 years old, of Albion, Mich., in whose honor Mothers' Day was inaugurated, recently recovered from an attack of pneumonia and celebrated her return to good health by taking several long motor trips in the Dodge Brothers motor car with which her son presented her.

More than twenty years ago her son first celebrated Mother's Day for "Grandma," as she is affectionately known in southern Michigan, and for many years the Albion Methodist Episcopal church has observed the Sunday nearest her birthday, May 13th, in her honor, as she is the only person who has maintained continuous relations with the church since its founding.

The efforts of the Albion Methodists to honor "Grandma" Blakeley have exerted such a wide influence that Mother's Day is now universally observed throughout the country on the second Sunday in May.

Despite her years, Mrs. Blakeley is an enthusiastic tourist. On one day in particular, with her son at the steering wheel and accompanied by several friends, she toured three counties and twelve townships, the speedometer registering almost 150 miles when the trip was completed. And when she reached home, she insisted on being allowed to assist in the preparation of the evening meal.

Her touring activities however have not been confined to the rear seat, for she herself has driven her Dodge Brothers car more than fifty miles, an enviable record for a woman of her age.

PAIGE ROADSTER SETS NEW INTERCITY MARK

A big Paige roadster, piloted by George M. Price of Seattle, established a new speed record for automobile travel between Seattle, Wash., and Vancouver, B. C., on Memorial day. Price's running time for the trip was only 3 hours and 42 minutes for the distance of 167 miles. The total elapsed time from start to finish, without deduction of time for stops, was 4 hours and 36 minutes, or an average of 37 miles an hour.

The principal delay of the trip, entailing a stop of 30 minutes, was occasioned at the United States and Canadian custom-houses on the border.

KEEP WHEELS ALIGNED

Keep a sharp eye on the alignment of the front wheels. They should toe in slightly. If they toe in too much or out too much a badly worn tire or tires is the price you will pay for the neglect.

AMERICAN WOMEN DEMAND BEAUTY IN MOTOR CARS

"The demand of the American woman for beauty in the automobile she drives or rides in is actually the foremost cause of the growth of the Paige company, which makes necessary the thirty-one-acre addition on which we are starting our great new building to care for the business which we are sure will come to us during the next year," writes Harry M. Jewett, president of the Paige-Detroit Motor Corporation, to E. E. Bodge, of von Hamm-Young, Paige distributors.

In line with the Paige policy of finding out the actual conditions which govern the public demand for automobiles, Smith Bros. have carried out in Los Angeles a detailed investigation of the preferences of women prospective buyers. Stanley Smith sums up the conclusions reached under four main heads:

"The woman prospective buyer demands, first, that her automobile shall be a beautiful car; second, that it shall be an easy-riding car; third, an easy car to control; and, fourth, that the power flows shall be flexible. These simple phrases, which appear to be so easy to understand, represent a complex series of technical requirements to the trained automobile engineer. They have all been analyzed at the Paige factory and the steps which have been taken to secure the different features are a part of Paige engineering history. For example, in the matter of easy riding, the foundation of the Paige reputation is the famous original Paige cantilever spring suspension, supplemented by comfortably designed seats, and seat springs and upholstery, which represent a development of several year's experience.

"The matter of ease of control is taken care of by providing a smoothly working clutch, easy gear shifting, smooth acting brakes and conveniently-arranged controlling devices. Each of these features has required months of individual study and experiment. The flexibility of power flow which gives the Paige its ability to skim over long, steep hills on high or low down to a walking pace in traffic is the result of the most skillful engineering work on the motor. It is hard for the public to realize in answering four simple questions that they are determining the direction of the mental activity of scores of highly trained designers and technical experts at the Paige factory.

"Nevertheless the great increase in Paige sales from year to year has been founded absolutely on determination of the exact qualities which make an automobile desirable and then working out every detail in harmony with the object. The Paige has been made 'The Most Beautiful Car in America' in addition to a car of wonderful power, endurance and economy, because American women prospective buyers place beauty first in making their choice."

WILLIE RITCHIE GIVES ACCOUNT OF AD CLUB RUN TO CONVENTION

Former World's Champion Makes Run to St. Louis With San Francisco Ad Men

"Traveling via automobile 2400 miles in fifteen days, battling with storms of every description for twelve of the fifteen days en route, is not what would be called an ideal vacation," says Willie Ritchie, former lightweight champion of the world. Ritchie has roughed it a lot, and his story of the San Francisco Ad Club's tour to St. Louis in interesting. He made the trip in Chairman James Houlihan's six-cylinder Buick touring car.

In describing the trip, Ritchie says: "It was a gay party about fifty strong that left the San Francisco City Hall at 8 o'clock Sunday morning, May 20, in fourteen automobiles. The weather was ideal and everyone expected an easy trip through to St. Louis. It was a far different sight when the tour drove up to the Planters' Hotel in St. Louis, Sunday evening, June 3. Of the original fourteen cars to start, but three remained (our Buick was one of the three), and they were covered with the mud and slush of seven states. The outward appearance of both passengers and cars showed the hard grind they had all been through, but a bath and clean clothes for the Ad Clubbers, and a wash and polish for the automobiles, was all that was necessary to put the portion of the caravan that was able to finish back into the condition they were in at the start of the tour.

"Snushine was encountered by the plucky Ad Clubbers on the first and last days, with an extra day of fair weather thrown in by the elements on June 1. This latter date was taken advantage of by the weather-beaten travelers to the extent of 265 miles, the longest day's run they were enabled to make.

All Sorts of Storm

"Storms of every description greeted the motorists in rapid succession on the journey. Beginning with the second afternoon heavy rains commenced. These in turn were followed by hail storms, more rain, a snow storm which developed into a real blizzard, then in Eastern Colorado another hail storm, with hail falling the size of an olive. A cyclone and finally a real Kansas tornado rounded out a program that should have discouraged any hardy band of men.

"Determined, however, to reach the St. Louis Advertising convention on time, the publicity men day after day stuck to the grind, driving from fifteen to twenty-one hours a day. News of their difficulties reached cities ahead of the mud pluggers long before control points would be checked off and the receptions extended were proportionately more cordial.

Hardest Day's Run

"Probably the hardest as well as the shortest day's run was from Evanston, Wyo., to Carter Wlo. The distance is about forty-five miles. It required seventeen hours of the hardest labor for cars and men alike to negotiate this mileage. The last nine miles were made in seven hours. Each car used at least five gallons of gas in covering that lap, and a 10 per cent down grade had to be traveled in low gear with throttle wide open. One surprising factor well worthy of comment is that despite the continued use of chains, and they were necessary for more than 2000 of the 2400 miles traveled, tire trouble was uncommon. Our Buick, Goodyear equipped, had but three punctures and no blowouts, these punctures happening within five minutes of each other.

"The most remarkable part of the trip is the way the three cars that were able to finish stood up under the terrific hammering they were subjected to day after day. Some idea of the heavy going may be had from the fact that from three to seven sets of heavy skid chains were worn out by each car.

"I have owned a much higher priced car for several years. In that time I have put it through some tough country and have had every chance to study automobile construction closely and to learn of the mechanical troubles that arise. I have never seen any car subjected to the test our Buick went against. Despite the continued strain on the motor, the driving gears, the brakes and cooling system, the car completed the run running just as perfectly as it performed on the first day of the tour.

"From this time on I'm a Buick booster without an equal."

GOVERNMENT IS BIG AUTO BUYER

"The Government has just distributed orders for 50,000 motor cars of all descriptions," said J. K. McAlpine, of Schuman Carriage Co., local distributer for the Hudson Super-Six. "This is just preliminary—the first of the war orders which shortly will demand practically all the cars of certain grades that can be manufactured. Fifty thousand motors are necessary for immediate organization use. We can only conjecture what tremendous demands will follow when the government begins to mobilize the great Army which will begin to take shape in a few weeks.

"Automobile men know they face a shortage. Many of them have bought stock far in advance of their usual schedule to be prepared. The general public also is beginning to realize that the car market will be short this year. It is not improbable, indeed, that the shortage will be so acute that dealers who have cars on hand will be able to ask almost any price they wish for them.

"If we need an example of how war strips the motor market we can find it in France, or any of the nations at war. France is now making five times as many cars as it did before the outbreak of the war, and only a few of these are available for private purchase.

"Many people in the United States are thoroughly aware of the situation and have prudently bought their cars while there is time. We have had a great many of these customers ourselves. The demand for Super-Sixes has been so great this year that there is great difficulty in securing sufficient numbers of them from the factory when we want them. I don't know how much war orders will increase this difficulty, but I do know war orders must take precedence.

"People intending to buy motor cars this year should place their orders now to be on the safe side."

RECORD GOLD BRICK

CHICHAGOFF, Alaska. — After a search lasting over two months the gold brick stolen from the store building of the Chichagoff mine was recovered hidden in a sand bank about a mile from the scene of the robbery.

The brick is valued at $23,000. Government agents believe it was dropped by the two men under arrest for the crime when they were hard pressed not far from the scene of the crime but the snow was deep and it was not until it melted that it was found.

DODGE CAR HIGH ON STATE TEST

"According to reports of the State registrations of automobiles for the five months of 1917, in California Dodge Brothers is leading all other makes of motor cars with the exception of one," declares E. E. Bodge of the von Hamm-Young Co., local distributors.

"For a car that has been on the market but a little more than two years, this is truly a showing to be proud of," continued Bodge.

In giving a brief summary of the history of Dodge Brothers, the local dealer stated: "At the time Dodge Brothers began making cars of their own design, about thirty-two months ago, the plant comprised 20 acres of fluoor space, but since then constant additions of new buildings have provided a total of 72 acres. A new structure just recently completed is an 8-story building, 210 feet long and 125 feet wide, to be used exclusively for the storage of rough and finished stock.

"The company employs 12,000 men, and is producing 350 cars a day. More than 145,000 cars have been built and sold in the first two and one-half years. This remarkable record is due to the manufacturing efficiency brought about by the use of the very latest methods and the best equipment it is possible to obtain.

"The factory is so laid out that the main assembly building, which is 1100 feet long, 60 feet wide, 4 stories high, and runs from east to west, is fed with parts and units from the other buildings and wings, which run from north or south. On account of its recent construction, the plant embodies practically every known modern device for efficient production of automobiles in quantities.

"An industrial railway completely encircles the plant and enters every department on the ground floor.

"In the heat treat department, from 90,000 to 100,000 parts are treated every 24 hours, and for this purpose 30 furnaces and 20 cyanide pots are required. A thousand pounds of cyanide are used each day in the latter; 14,000 gallons of fuel oil are consumed each day for heating the furnaces in the forge and heat treat departments.

"In the foundry 10,000 lbs. of aluminum and 30,000 lbs. of brass and 170,000 lbs. of gray iron are cast each day.

"Such is the perfection of detail in this huge plant that 2 hours and 35 minutes from the time the bare frame starts in on the upper end of the final assembly conveyor, the car is driven off under its own power at the end of the line, thoroughly built and fully equipped."